VARIABILITY OF WETLAND REFLECTANCE AND ITS EFFECT ON AUTOMATIC CATEGORIZATION OF SATELLITE IMAGERY

V. Klemas and D. Bartlett
Center for Remote Sensing
College of Marine Studies
University of Delaware

January 10, 1977
Report on Significant Results
NASA LANDSAT CONTRACT NAS5-20983

Prepared for
GODDARD SPACE FLIGHT CENTER
GREENBELT, MD 20771

SIGNIFICANT RESULTS

A technique for training automated analysis of satellite (LANDSAT) multispectral data based on *in situ* measurements of target reflectance was tested and applied in delineating cover types in Delaware's tidal wetlands. The technique evaluated uses *in situ* measurements of target radiance and an atmospheric correction procedure to derive reflectance signatures for land-cover categories in preference to the relative radiance signatures traditionally derived from training samples within the satellite data itself.

Land cover categorization of data from the same overpass in four test wetland areas was carried out using a four-category classification system. The tests indicate that training data based on *in situ* reflectance measurements and atmospheric correction of LANDSAT data can produce comparable accuracy of categorization to that achieved using more than four wetlands cover categories (Salt Marsh Cordgrass, Salt Hay, Unvegetated and Water Tidal Flat) produced overall classification accuracies of 85% by conventional and relative radiance training and 81% by use of *in situ* measurements. Overall mapping accuracies were 76% and 72% respectively. Further refinement of the atmospheric correction and ground measurement procedures should produce even better accuracies in a more operational mode.

In addition, field measurements showed that variability in spectral reflectance was, as expected, symptomatic of significant physical characteristics of the test cover types such as time elapsed since tidal inundation of mud, plant height, and growth form. Significant correlations were found between single band reflectances and tidal inundation and plant morphologic characteristics. Optimization of seasonal sampling procedures for detection of plant morphologic parameters were suggested.